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26

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Venter

Serial No. : 09/867,870

Filed : May 30, 2001

For : VIDEO ON DEMAND

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Ronald B. Hildreth
Attorney Name

19,498
PTO Reg. No.

Signature

August 6, 2001
Date of Signature

CLAIM FOR PRIORITY UNDER 35 U.S.C. §119

Assistant Commissioner of Patents

Washington, D.C. 20231

Sir:

A claim for priority is hereby made under the provisions of 35 U.S.C. §119 for the above-identified U.S. patent application based upon South Africa patent Application No. 2000/02688 filed May 30, 2000 . A certified copy of this application is enclosed.

Respectfully submitted,

Ronald B. Hildreth
Patent Office Reg. No. 19,498

Attorney for Applicant
212-408-2544

Baker Botts LL.P
30 Rockefeller Plaza
New York NY 10112

NY02:339958.1

Sertifikaat — Certificate

REPUBLIEK VAN SUID-AFRIKA

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PATENT OFFICE

DEPARTEMENT VAN HANDEL EN NYWERHEID

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF TRADE AND INDUSTRY

Hiermee word gesertifiseer dat
This is to certify that

The documents attached hereto are true copies of the Application form, Provisional Specification and Drawings of Patent Application No. 2000/02688 filed in the name of VENTER, Johan Izak Jacobus on the 30 May 2000 and entitled " VIDEO ON DEMAND" Assigned to MOYSES, Maria Elizabeth Danetta on 8 March 2001.

CERTIFIED COPY OF PRIORITY DOCUMENT

[G]eteken te / [Si]gned at PRETORIA in die Republiek van Suid-Afrika, hierdie / in the Republic of South Africa, this 25 dag van / day of July 2001

Registrateur van Patente
Registrar of Patents

REPUBLIC OF SOUTH AFRICA REVENUE

FORM P1

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT

[Section 30 (1) - Regulation 22]

Revenue stamps or revenue franking machine impression

Official date stamp

The grant of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicat

OFFICIAL APPLICATION NO.		
21	01	20002688

(i) APPLICANT'S OR AGENT'S REFERENCE

(ii) FULL NAME(S) OF APPLICANT(S)

71 ~~VENTER, Johan, Izak, Jacobus~~
MARIA ELIZABETH DANETTA MOYSES

28.5.2001 AANSOEKERS VERVANG / APPLICANTS SUBSTITUTED

REGISTRAR OF PATENTS, DESIGNS, TRADE MARKS AND COPYRIGHT
2000 -05- 30
REGISTRATEUR VAN PATENTE, MODELLE, HANDELSMERKE EN OUTEURSREG

(iii) ADDRESS(ES) OF APPLICANT(S)

~~246 ARGO PLACE~~
~~WATERKLOOF RIDGE 0181~~
3 LYNNWOOD GARDENS
THE RING, LYNNWOOD,
GAUTENG, REPUBLIC OF SOUTH AFRICA

(iv) TITLE OF INVENTION

54 **VIDEO ON DEMAND**

(v) The applicant claims priority as set out on the accompanying form P2.
The earliest priority claimed is

(vi) This application is for a patent of addition to Patent Application No. 21 01

(vii) This application is a fresh application in terms of section 37 and is based on Patent Application No. 21 01

(viii) This application is accompanied by:

X	1.	A single copy of a provisional ~~or complete~~ specification 19 pages.
X	2.	Drawings of 1 sheets.
	3.	Publication particulars and abstract (form P8 in duplicate).
	4.	A copy of Figure ______ of the drawings for the abstract.
	5.	An assignment of invention.
	6.	Certified priority document(s) (state number):
	7.	Translation of the priority document(s).
	8.	An assignment of priority rights.
	9.	A copy of the form P2 and the specification of SA Patent Application No. 21 01
X	10.	A declaration and power of attorney form P3.
	11.	Request for ante-dating on form P4.
	12.	Request for classification on form P9.
X	13.	**Form P2 + copy**

(ix) 74 Address for service: **HAHN & HAHN INC, 222 Richard Street, HATFIELD, 0083, Pretoria**

Dated this **30** day of **May** 20 **00**

Signature of applicant(s) or agent

This duplicate will be returned to the applicant's address for service as proof of lodging but is not valid unless endorsed with an official stamp

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HAHN & HAHN INC FORM P6

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

[Section 30 (1) - Regulation 27]

OFFICIAL APPLICATION NO.		
21	01	20002688

LODGING DATE	
22	30/05/2000

FULL NAME(S) OF APPLICANT(S)

71

MARIA ELIZABETH DANETTA MONSEJ

~~VENTER, Johan, Izak, Jacobus~~

APPLICANTS SUBSTITUTED

28·5·2001

FULL NAME(S) OF INVENTOR(S)

72

VENTER, Johan, Izak, Jacobus

TITLE OF INVENTION

54

VIDEO ON DEMAND

This invention relates to providing a selected video on demand (VOD) service via satellite, to be screened immediately and without any delay on one's television screen.

The concept behind a true video on demand service is as follows:

A user is able to request a specific video from a menu of videos that is superimposed on the television screen. Having selected a specific video, a request is sent via a return-link to a studio storing many thousands of videos. The specific video is then transmitted to a set-top box in the user's home.

The video is stored on a hard-drive in the set-top box, from where the movie can be viewed at leisure for a 24 hr period. After the 24 hr period has expired the video is deleted from memory.

The user is charged per movie downloaded.

Ideally the entire movie should download to the set-top box within a few minutes to minimise the time between requesting a video and viewing it.

Video streaming is a method of delivering video, audio, or other multimedia content to PC's via the Internet, at news bureaus, government agencies, corporations, and others who have a need for instant access to program content. For a news bureau this may be live video from an ongoing news event, for a government agency this may be information conveyed to district offices on a new marketing program.

Most Quicktime, AVI or MPEG video files need to be downloaded completely before they are displayed. This usually takes quite some time. Streaming video begins to play just a few seconds after the viewer clicks on the link. The quality is lower, but the experience is more immediate.

Streaming Net video represents the first mass-market implementation of video-on-demand. Viewers are given a choice of video sequences on a given subject, to view with immediacy. A website with well-designed video elements can provide a viewer experience that broadcast television cannot offer. For viewers at all connection speeds, video adds impact.

An encoder will convert files from standard formats like AVI, QuickTime, and MPEG and make them into streaming formats using at present different proprietary compression algorithms.

Streaming video is typically implemented through IP multicasting, a bandwidth conversation technology that enables multiple PC's to tap into a single stream of data. Data that is sent one-on-one is called unicasting.

Video on demand (VOD) via satellite has up to now been technologically impossible, due to the very large data requirements of video and the available speeds of transmission of data. Video can be transmitted via satellite, which is much faster than via landline or cell (mobile) phone line but still not fast enough to be feasible. Cable transmission for television has been a solution in wealthy countries, using optical fibre cables for their superior capacity and where extensive cable networks already exist these systems are in use. However, capital investment to initiate such a network from scratch is prohibitively costly in most economies of the world, except the wealthiest. For example, system architecture for such a system on an economically viable scale could cost in excess of R 100 billion due to South Africa's and some other country's demographic diversity.

As mentioned, satellite bandwidth requirement for downloading videos is too high to be economically viable and technically feasible using satellite transmission. To install a dedicated satellite may cost in the order of R 300 million but even then, the clear widely held view of the art is that it is still not possible to provide a technical solution for video on demand.

Satellite bandwidth is traditionally leased in blocks corresponding to a transponder on the satellite but new operators are offering lease of bandwidth in 2MHz units.

Satellite transponder specifications vary quite dramatically as follows:

Bandwidth: from 24MHz to 72MHz, but typically 36MHz.
Total number of transponders: from 8 to 18 with typically 12 on currently operational satellites.

A 36 MHz transponder corresponds approximately to a 45Mbit/s digital transponder. This is a function of the satellite link budget which takes into account transmitted power, antenna size, ground station specifications, customer antenna characteristics, error correction, modulation technique etc. The maximum information carrying data rate for such a transponder, is approximately 39 Mbit/s. This figure is dependant on the amount of overhead that has to be added for error correction, conditional access coding, signalling, monitor, control etc.

Unlike cable-based systems, which are truly broadband, most satellite systems are narrow band systems. Even though the entire satellite can be regarded as broadband, the maximum channel bandwidth is limited to the bandwidth of a single transponder. The satellite transmission system DVB-S (Digital Video Broadcasting over Satellite) is a single carrier system, i.e. it can only access a single transponder at any one time. Any number of MPEG 2 streams can be multiplexed onto a single DVB-S carrier, depending on the bit rate of the streams. There are two possible ways of implementing the VOD system which impact on how the satellite's transponders will be utilised. To assess these approaches we assume the scenario of a 90 minute video, capable of being transferred at VHS quality at a rate of 1.2Mbps amounts to 0.81Gbytes of data.

Approach 1: True VOD, where each user gets a real-time video stream at the normal bit rate. Each of these streams would be encoded using MPEG2 442@ML, the recommended compression scheme. For VHS quality video streams, a bit rate of 1.2 MBit/s can be used. With a transponder bandwidth of 39Mbit/s, 32 different streams could be transferred simultaneously on one transponder. The stream can be buffered and stored on the STB and can provide VCR like functionality including limited fast forward (according to the buffer duration), pause and rewind of the movie.

Approach 2: Transmit the entire movie as fast as possible. Unlike cable-based systems, to do this over satellite, it would take a far longer time. For example, a 0.81 GB movie contains 6480 Mbits of information. Utilizing the entire transponder bandwidth of 39 Mbits/s, we can transfer 0.81GB in just under 3 minutes (166 seconds) to a user.

A brief analysis of these two approaches follows:

	Approach 1	Approach 2
Videos transmitted	32 per 90 minutes	1 per 2.75 minutes
Videos transmitted per hour	21	21
Customer equipment bandwidth	1.2Mbps	39Mbps
Minimum delay between customer requesting video and start of video (assuming transponder availability)	A couple of seconds	2.75 minutes

This analysis indicates that, operating the transponder at full capacity, the first approach:

Relaxes the maximum data handling capacity of the customer equipment hence making it far cheaper.

Minimizes the time before start of play of the video

Since the total bandwidth used is identical in the two approaches, both can carry the same number of video streams per hour.

The total number of videos rented in any hour and a half (90 minutes) period is 32 times the number of transponders rented. On this system it is clear that, by utilising the entire bandwidth of a satellite, with 12 transponders being the norm, with present technology, only 384 VOD subscribers can be satisfied at any given point in time. The cost involved in satisfying the 384 subscribers would be approximately R252 million per year.

The satellite bandwidth required for the VOD service depends on a number of issues, as follows:

1. Operational scenario e.g. Real time VOD or virtual real time
2. Number of customers
3. Variety of customer's choice (since more than one customer could potentially request the same video)

A near VOD service provides a more cost-effective utilisation of the satellite bandwidth and significantly increases the number of subscribers that can be serviced. For instance, if a particular movie is scheduled to start at 20:00 and then again at 22:00, an unlimited number of subscribers can watch that movie if they are prepared to watch that movie at the scheduled times. If on the other hand, true VOD is required, then there are limits on the number of subscribers due to the satellite capacity.

According to the invention there is provided a method of providing a simulated video on demand which comprises the steps of assessing viewing patterns of video fans, selecting a list of videos from the latest released stock of videos, transmitting via satellite at quiet times to and storing on a hard disc of a computer (STB) provided with a user's television that list and regularly updating that list with new releases, for example, on a first in- first off basis.
This means that the subscriber thinks that they are receiving true VOD when in fact they are receiving near VOD. The 'simulated' scheme is a hybrid that combines both the previous approaches using local storage as a buffer to

create the illusion. The size of the buffer determines the near VOD window and depending upon business decisions can vary from 0% of the movie to 100% of the movie (as the lower and upper bounds).

In addition, the method preferably comprises push-pull marketing whereby viewers are reminded that first on videos will be taken off the list after a specified time limit, e.g. a two-week time span. Merely as a non-limiting example, there can be 14 new releases per month in such a system.

Because all VOD subscribers at all times have immediate access to the top 12 Latest Releases as well as to 5 other Videos they have pre selected from the Catalogue, plus theTop 10 Promotional Videos at any given point in time, a very small percentage of the subscriber base will need to be satisfied with any other Obscure product. Satellite Bandwidth requirements is therefore limited to satisfying the small percentage of VOD subscribers wishing to view Videos or relates material other than their own predetermiend choice already availbe on the Set-Top Box.

By virtue of the 80:20 business principle, 80% of viewers will likely be satisfied by this type of supply of 20% of available videos, or similar percentages. Hard disc costs have declined to such a degree that, for example, a 20-gigabyte hard disc is an economic proposition for installation on users' home equipment.

If 100% of the movie is stored locally, then very little satellite capacity is required (only instructions to unlock the movie is required to be sent via the satellite).

If 0% of the movie is stored locally, then maximum satellite capacity is required. There are still ways of creating a very small window though. For instance:

1. Playing trailers (can probably spend five to ten minutes doing this!)
2. Waiting a short duration of time (say three to five minutes) before playing the movie
3. A combination of the above two.

Some salient general information pertinent to this discussion is now provided below:

Movie lengths vary from about 75 min to 200 min. Most movies (subjectively) fall into the 90 to 115 minute range. Some extremely long movies are:

1. 'Lethal Weapon' takes about 123 minutes
2. 'Evita' about 134 minutes
3. 'Saturday Night Fever' takes about 194 minutes.

VHS quality movie streaming can be done at about 1.2 Mbps. This works out to about:

1. 135 MB for 15 minutes
2. 180 MB for 20 minutes
3. 1.08 GB for 120 minutes.

Preferably in addition, in accordance with the invention a series of techniques is used by which a viewer is prompted to order further videos of his choice to be transmitted on his special order or demand by satellite overnight or at other quiet times, to be stored on hard disc and then available for viewing.

A careful selection of known popular movies is downloaded to subscribers STB HDDs during off peak hours. Since there is most demand for these movies, many subscribers will get true VOD performance without affecting satellite capacity during peak time. The HDD size required will approximately be:

m * 1.2 GB (where 'm' is the number of movies)

Then the number of less popular movies that can be streamed simultaneously from one transponder is approx. 32 (i.e. less than 39 Mbps/1.2 Mbps)

So at worst case the maximum number of subscribers who wish to view less popular movies that can be catered for is the same as the maximum number of movie streams:

tx * 32 (where 'tx' is the number of transponders)

With this system, an unlimited number of subscribers can view the popular movies.

Table A: Analyses Product mix VOD usage per Day in peak viewing time (1 300 000 subscribers).

Subscribers	*Category Video usage per day*			
	Normal	*X2*	*X3*	*VOD*
New Releases	30 507	61 013	91 520	122 027
Own Choice	7 474	14 948	22 422	29 897
Promotional	122	244	366	488
VOD	31	61	92	122

Taking the calculations above into consideration, it is clear that the company would need to hire a total of transponders that can support the total number of streams required at any giventime during the peak VOD viewing period. As the bulk of the subscriber base (96%) are at all times compelely being satisfied with a true VOD service with compelte VCR runctionality, it is only the remaining 4% of the otehr two categories (Promotional and VOD) that needs to be satisfied. This is with "on demand" downloading to the subscriber's Set-Top Box via satellite. The promotional category can be planned in terms of available Video's on the total subscriber base. This system enbles the company to manipulate bandwith usage.

Tabe 29 clearly shows the total number of transponders that will be required to satisfy the subscriber base at any given time. At the 1 300 000 subscriber base there will be a maximum of 116 simultaneous downloads, which equates to 122 individual streams that will be sent. By downloading VHS quality to the subscriber base, Intelkom (Pty) Ltd needs to hire 4 x 36Mhz transponders.

One example of such a technique is to display either on demand or automatically interposed between or before beginning display of selected videos or at other times, a catalogue of videos from which selection may be

made, if the user so chooses. For example, a provision may be made to take five videos of the user's choice.

Each STB stores a maximum of say 5 videos locally. The first 5 videos (those the customer most wants to see) are selected by the customer on installation of the STB and can be downloaded over say the next 24 hours, when the satellite capacity is available and also to maximise the possibility of downloading the same video to multiple customers at one time.

This approach is based on the premise that if a consumer were asked to rank the 5 videos he/she would like to see next, these would not change dramatically over a short period of time, say a week or two. As such, once his/her STB is loaded with the ten videos that he/she would most like to see next, the chances are that he/she would most want to see one of these videos, and not one that has not been downloaded to the STB.

This implies that the customer will only have access to the service 24 hours after initial installation, which should not be a problem.

The customer can then select any one of the 5 videos to watch. Alternately he can select to replace one or more of the selected 5 with his next choice/s. These can then be downloaded over the next 24 hours. There will therefore be times when some of the 5 videos on the STB have been seen by the customer. The download of new videos must be possible in the "background" i.e. Can occur whilst the customer is watching a video.

From a management point of view, the system can accumulate all requests for new videos over say a 12 hour period, process these requests and wherever possible send the video simultaneously to many customers, thereby minimising bandwidth utilisation.

If the customer watches ten videos in less than 24 hours, then no new videos will have been downloaded. This is obviously an extreme case and not really one worth worrying about.

The STB can be set-up so that it monitors which videos have been viewed and prompts the user to select a new video from the studio's archive.

With this approach, the video transfer over the network can be prescheduled and balanced so that the transponder capacity is optimally utilised. Based on the calculation previously 21 videos can be streamed per hour. This implies that 504 videos can be streamed per transponder per 24 hours which could be sufficient to cover many of the customer requests. If a full satellite carrying twelve 36MHz transponders were used, 6048 videos could be streamed every 24 hours which should be more than enough hence a single satellite is adequate for this application.

Through some price-break scheme, customers could be encouraged to select the most popular movies (which would be calculated by the management system daily) and this would reduce the total number of videos that would have to be transmitted over the network, thereby reducing bandwidth requirement and cost.

In this scenario, the STB can use the return link at a pre-programmed time to minimise the communication and data handling capacity requirements at the studio.

The videos could be auto-deleted by the STB after say 1 week. Billing will be done on two events:

Download of video

Each time the video is viewed

Temporary outages on the satellite, studio or earth station are also not critical since there is sufficient time to send the video to the user.

Another example is to provide promotional videos loaded onto the hard disc in addition to new releases and to advertise their presence to the user for optional selection. Again, the promotional videos list can be updated at regular time intervals with push-pull marketing carried out in respect of them. This category could have a window of data of the video already downloaded onto the subscriber's STB, while the balance of the data is downloaded in real time when a request for a video comes in. This approach is explained below by creating a 20 minute window.

The 20 min window can be created by storing 15 min of the movie locally and playing about 5 mins of trailers. When a user requests a popular movie, firstly 5 mins of trailers will be played then the 15 mins of stored material is played. During these 20 mins, the STB will align with one of the 20 min window streams. Table 1 shows the strategy for streaming a 135 min movie.

15 mins is already on the hard disk of the STB, so only the remaining 120 mins needs to be streamed. Each row shows the activity in a particular 20 min window. A full 120 min stream begins at time zero (shown as the light grey stream in the 20 to 0 min window slot, i.e. row '0').

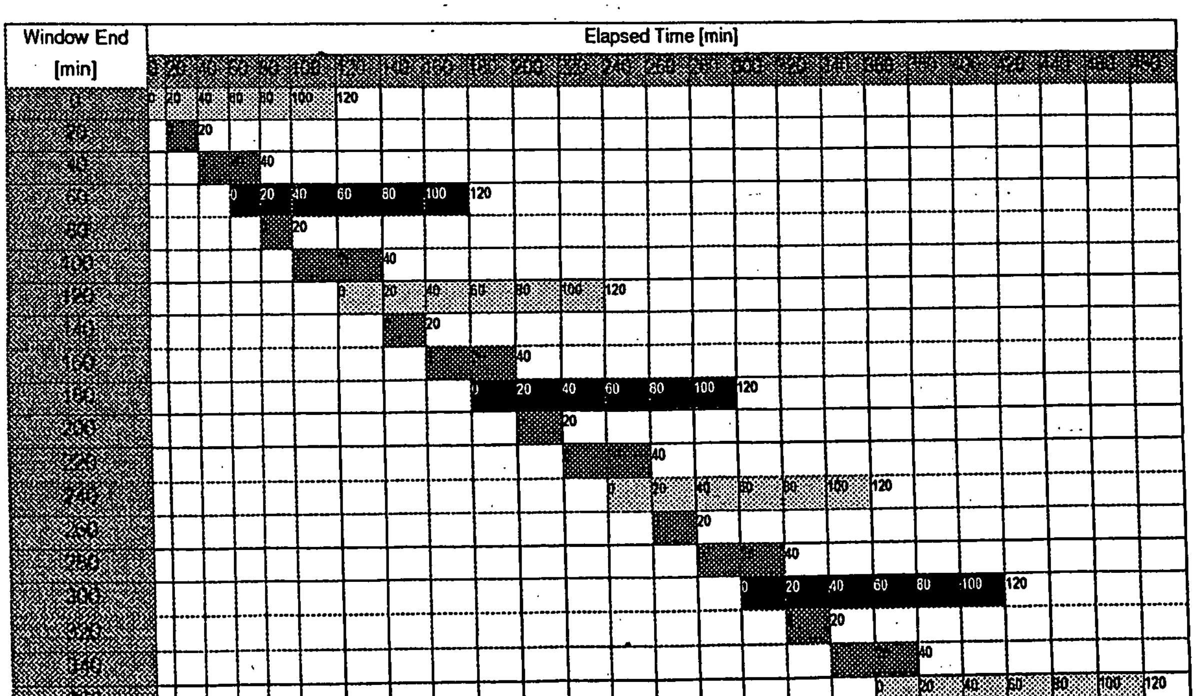


table 1: Maximum demand scenario

Any requests for this movie that occurs between 0 and 20 mins will utilise the dark grey filler stream that begins at the 20th minute. While the STB is receiving the dark grey filler stream, it at the same time will receive the remainder of the entire light grey stream from the 20th minute onwards too. Consequently, all the necessary pieces to construct a full movie will be received by the STB as shown below.

In the same manner, all the pieces to construct a full movie for a request in the 80 to 100 min window (row '100') is shown below.

A full stream is played every hour (indicated by the light grey or black streams). So a STB has to tune into a maximum of two streams and if a request is made during the window for which either the light grey or black stream starts, then the STB only has to tune into one stream! A maximum of three streams at any point in time will be required to simulate true video on demand (as shown in the period from 60 to 380 mins in Figure 3)

Table 2 shows the capacity utilization for this movie on the transponder when transmitting according to Table 1. Each stream occupies 1.2 Mbps for VHS type quality. A maximum of three streams is therefore 3.6 Mbps (compare to a useful payload capacity of about 37 Mbps on the full transponder). Under these conditions 10 popular movies can be streamed using one transponder.

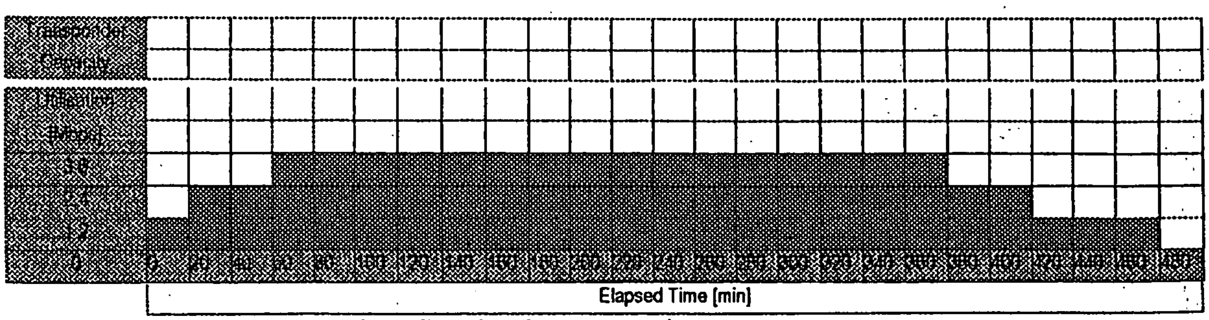


Table 2: Transponder capacity utilization for one movie

The Table below, Table 3, shows the same movie under a situation of lesser demand. During window periods ending at 40, 80, 140, 160, 180, 260, 320 and 340 mins, there are no requests made for the movie. However, even if no demands were made during the window period ending at say 180 min, the black stream would still have to be transmitted under this scheme.

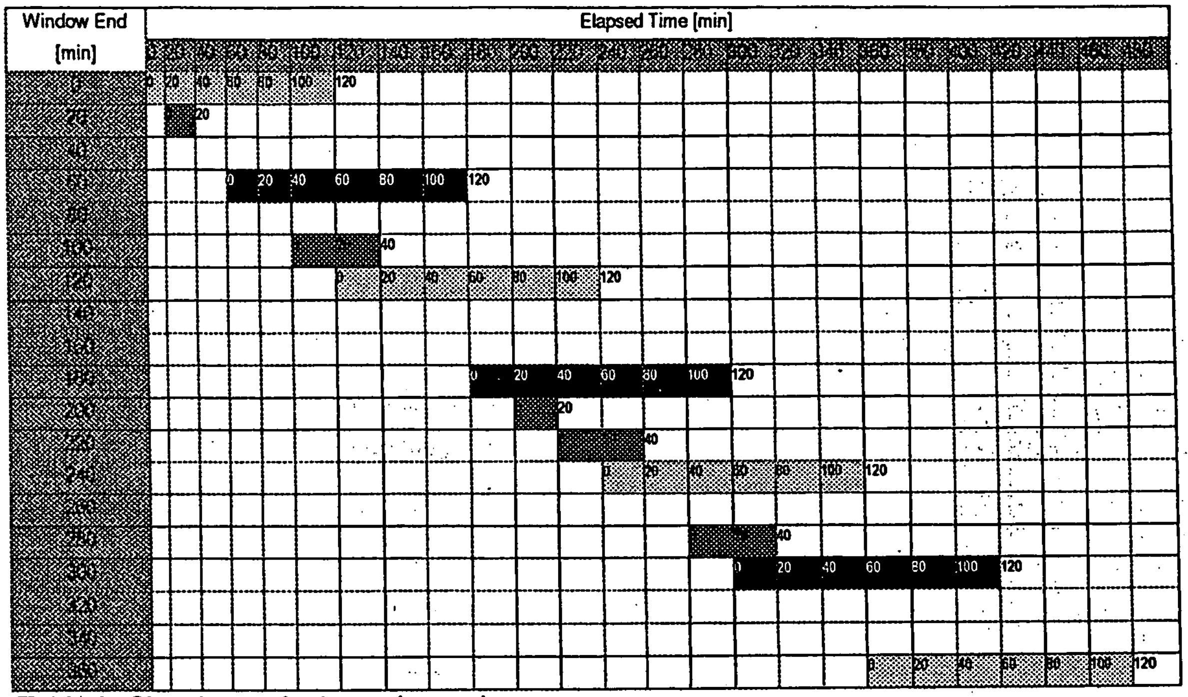


Table 3: Situation under leser demand

The transponder capacity utilisation under the lesser demand situation described above is shown in Table 4 below. The average utilisation is about 2.4 Mbps which will allow approximately 15 popular movies to be streamed per 36 MHz transponder.

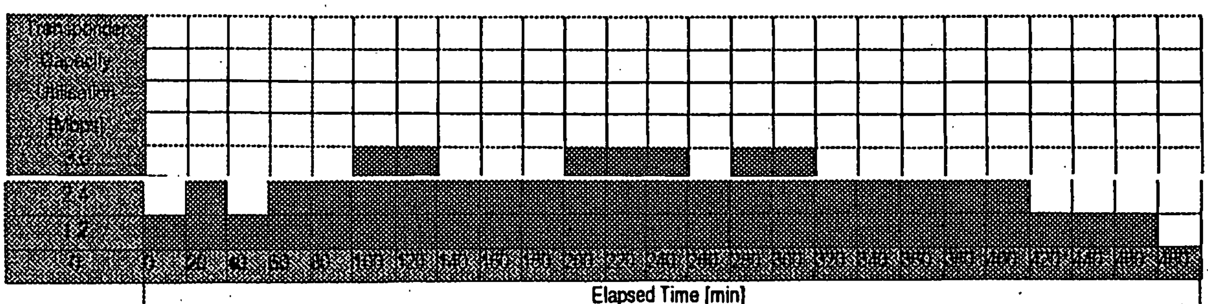


Table 4: Transponder capacity utilization for one movie under lesser demand

Best utilisation of the transponder capacity will probably be achieved by not sending the maximum number of streams of popular movies possible. Say,

20% of transponder capacity should be reserved for obscure movies that can be bursted over multiple streams to fill transponder capacity. The obscure movies should only start in the appropriate window after they have been demanded and not on a predictive basis.

Approach 2: Create a 20 min window; but stream portions of the movie only as needed

Window End [min]	Elapsed Time [min]																								
	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480
0	0	20	40	60	80	100	120																		
20			20																						
40					40																				
60				0	20	40	60																		
80							40		80																
100						0	20			80	100														
120							0	20	40	60		100	120												
140								0	20																
160											40		80												
180										0	20	40	60												
200											0	20	40		80	100									
220												0	20												
240													0	20	40	60	80	100	120						
260															20										
280																	40								
300																0	20	40	60	80	100				
320																	0		40		80				
340																		0	20						
360																			0	20	40	60	80	100	120

Table 5: Maximum demand scenario)

Approach 2 is similar to approach one, but the streams are created only as needed and therefore uses less of the satellite space segment.

A request for the movie occurring in the window period ending at the 100th minute is honoured by using the pieces above the required row from the 100th to the 220th minute as shown below:

0		40		80	100	120

Similarly for a request coming in the window period ending at the 220th minute as shown below:

0	20	40		80	100	120

That request however causes the maximum number of stream segments (i.e. 5) to be used as shown by the number of colours above and as seen below.

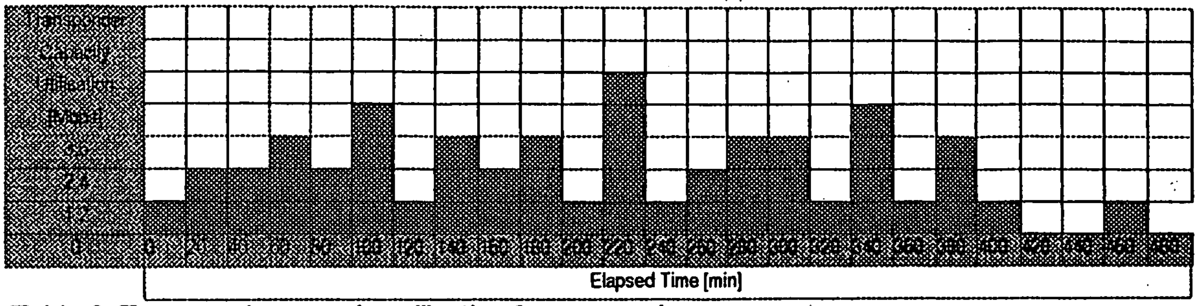


Table 6: Transponder capacity utilization for one movie

The average transponder capacity utilisation in approach 2 drops to 2.4 Mbps per movie from the 3.6 Mbps in approach 1 under conditions of maximum demand. However, more bursty traffic is generated. So keeping the number of popular movies that can be streamed simultaneously the same as in approach 2, a larger number of obscure movies can be streamed on demand in approach 3.

Suppose similar to the situation in Table 5, during window periods ending at 40, 80, 140, 160, 180, 260, 320 and 340 mins, there are no requests made for the movie: then the situation under this lesser demand will appear as in Table 7.

Window End [min]	Elapsed Time [min]																								
	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480
0	0	20	40	60	80	100	120																		
20		0	20																						
40																									
60				0	20	40	60																		
80																									
100						0	20	40	60	80	100														
120							0	20	40	60		100	120												
140																									
160																									
180																									
200											0	20	40	60	80	100									
220												0	20												
240													0	20	40			100	120						
260																									
280															0	20	40	60	80						
300																0	20			80	100				
320																									
340																									
360																			0	20	40	60	80	100	120

Table7: Situation under lesser demand

The corresponding average transponder capacity utilisation for one movie also drops as shown in Table 8 to less than 2.4 Mbps.

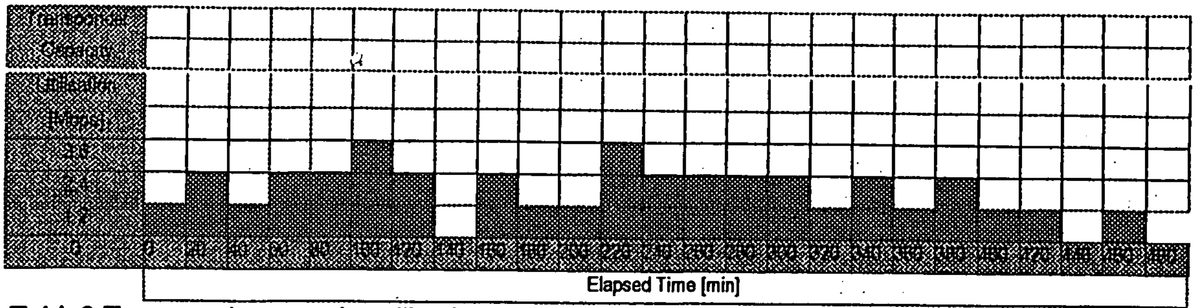


Table8 Transponder capacity utilisation under lesser demand

The disadvantage with approach 2 is that it requires a lot more intelligence on both the STB and the video server side to be able to accomplish this task than approach 2, which in turn is more difficult than approach 1.

Thus, the method according to this invention includes creating algorithms, which define viewing patterns of viewers and selecting videos according to these patterns from time to time by loading these onto the hard discs of users of the system and updating these analyses of viewing patterns at regular intervals. For example, viewing pattern data can be fed into the algorithms by use of information obtained from video outlet stores, preferably country wide, or over a region in which that pattern is to be used as the basis for downloading onto users hard discs.

The invention thus also provides a central or master computer which is characterised by having loaded onto it software having algorithms which are adapted to carry out the viewing pattern analysis described. Such a computer will also be adapted for control and direction of transmission to users or a supplementary or dedicated computer or computers can be provided for this task.

Preferably, the system is transparent to the user so that he is not aware which videos is simulated video on demand, taken from hard disc, and which

via satellite on demand so that an impression of overall video on demand is given.

The invention thus also provides hardware with a television viewing or CRT (Cathode Ray Tube) which includes viewing means, data storage hard disc of large capacity, means for reception via digital satellite receiver video material, means for storage of such material on the hard disc, means for election from that material of videos for display and viewing.

Thus the invention comprises hybrid technology including pure or correct video on demand technology plus localised storage of videos which have been downloaded from digital satellite transmission at quiet times e.g. at early hours of the morning.

Thus, a computer in accordance with this invention comprises one programmed with software algorithms, which are adapted to provide the functions, which are described herein.

Preferably the means in a accordance with the invention, in addition to the hardware described, includes a land line link together with a computer which has been programmed with algorithms to provide reporting of videos which are seen, to levy a charge for those seen and to generate invoicing of the user according to the viewing done on a periodical basis, for example, once a month. The software can also provides for a basic rental which is due and payable irrespective of use or videos seen, to reflect value of the installation made at his home system.

Preferably the land line link and supporting hardware and software are adapted to allow a selection of videos other than those loaded onto the hard disc to be transmitted to a central database of videos via land line. Such selected videos will be released to the user via satellite, subject to account payment being up to date etc.

Preferably, the system is adapted further to manage financial aspects including credit control against payments by users. Payments by users can be implemented by software adapted to carry out electronic transfer of money from users banks or other accounts according to a regimen of payment schedules which are captured in the database of users and their details and transactions, i.e. videos viewed and other transactions.

Videos selected via land line and then transmitted by satellite can be given restricted availability to the viewer in respect of time, e.g. available only for 24 hours to view, after which video is removed from the e user's hard disc.

The system is preferably provided with code protection, firewalls and other techniques of protection against hacking into the system by unauthorised people.

System architecture is schematically illustrated in the attached drawing. There are three main systems at the ground station - satellite 1, the studio 2 and the home 3. The satellite 4 is a PAS-7 Gentlest or Intelsat receiving signals from the ground station 5. The satellite sends on the signal to the satellite dish 6 at the home which passes the signal to the set top 7. The set top provides the simulated video on demand to the TV set 8 under the users control using remote 9. A use signal is sent to the studio for charging. The studio has a library, e.g. of 30 000 videos stored at about 1,2 gigabyte per video on average. The videos selected each month or week as most popular are supplied from the studio to the ground station.

DATED THIS 30th DAY OF MAY 2000

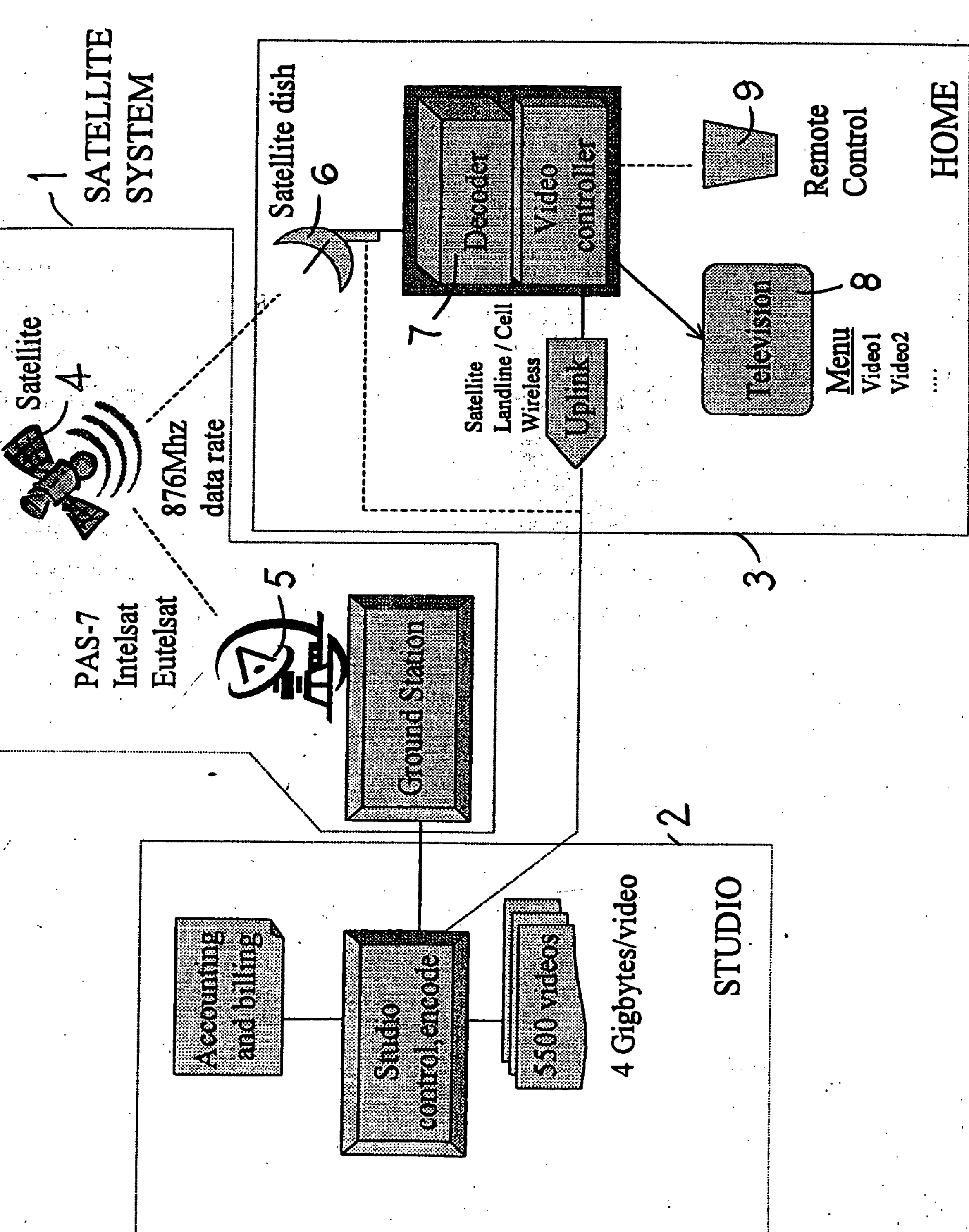
HAHN & HAHN INC.
AGENT FOR APPLICANT

VENTER, Johan, Izak, Jacobus

20002688

1 SHEET
SHEET NO 1

VIDEO ON DEMAND



HAHN & HAHN INC
Agent for Applicant